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ABSTRACT

Based upon Keith Davis's 1952 Ohio State doctoral dissertation on Episodic Communication Channels in Organizations (ECCO), further testing with ECCO methodology has found this analytic procedure to be basically sound, though it has expected weaknesses. Using a working situation as an example, surveys were taken to test the qualities of intra-office and intra-organization communications. Results supported Davis's functioning definition of ECCO analysis and demonstrated the strength of reliability and the weakness of inadequate subject response. (CH)

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AN OVERVIEW OF ECCO METHODOLOGY

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The purpose of this paper is to provide a common methological frame of reference from which to view the research papers presented in the Division IV program entitled "ECCO Analysis as a Research Strategy." Thus, the paper has been designed to provide a brief description of ECCO methodology, along with an analysis of its basic strengths and weaknesses. Specifically, this paper will answer four basic questions: (1) What is ECCO Analysis?, (2) How does ECCO Analysis work?, (3) What are the strengths of ECCO Analysis?, and (4) What are the weaknesses of ECCO Analysis?

What is ECCO Analysis?

As most readers know, ECCO (Episodic Communication Channels in Organizations) Analysis was developed by Keith Davis for use in his 1952 Ph.D. Dissertation at Ohio State. Davis describes ECCO Analysis as a research methodology designed to record and map actual communication patterns in an organization in terms of such variables as times, media, subject matter, and organizational level (1953, p. 301). Put another way, Ecco Analysis allows a researcher to focus on a particualr unit of information and follow it through time and space from the beginning to the end of its journey through a given organization. Thus, it is possible for the researcher to construct an organizational communication network network flow-chart from data collected by this means. This empirically derived communication network can then be compared with the formal organization chart or related to a number of other variables (e.g., seniority, physical proximity of work stations, age, sex of members, etc.). Davis argues

that by subjecting communication variables to measurement and tabulation, ECCO Analysis can do for communication problems what the development of attitude analysis did for morale problems (1953, p. 301).

How Does ECCO Analysis Work?

The question "How does ECCO Analysis work?" may be answered in general terms by means of an examination of the specific procedures employed in: (1) selecting subjects, (2) preparing research instruments, (3) collecting data, and (4) analyzing data.

Subject Selection. Since ECCO Analysis is designed to provide a descriptive analysis of the pattern of communication flow in a given organization, the problem of subject selection is best handled by means of surveying the entire population of that organization. However, the methodology is flexible enough to deal with samples of the population where field conditions, or perhaps even the research question posed, do not permit or require a survey of the entire population. Obviously, the various important issues related to sample selection are beyond the scope of this paper; however, the reader is undoubtedly aware of the significance of these issues to ECCO Analysis as well as other types of research methodologies.

Research Instruments. There are only two sets of research materials necessary to conduct an ECCO Analysis: (1) a set of code sheets, and (2) the ECCO questionnaire. Each of these instruments will be described and illustrated below.

As the name implies, the code sheets consist of a series of numbers designed to identify each of the subjects (and sometimes outside persons such as "my lodge brother" or "my wife") involved in the study. While there are any number of appropriate methods one

might use to establish such a code system, Davis describes the system he used at the Tex Tan Company in the following:

> In order to tabulate data mechically, each person was given a code number which denoted whether he was management or perative, was line or staff, what his function, and his organizational level were. For example, 141116 meant respectively, management (1), fourth level (4), line (1), belt factory (1), and Joe Smith (16) (1953, pp. 304-305)

These code sheets are given to each of the subjects to keept at his work place for use with the ECCO questionnaire to identify both himself and the source(s) of his information. Davis' discussion of the use and value of these code sheets may be found in the following:

> When a person had to fill out a communication questionnaire, he looked on his list for the name of his communication initiator and wrote that person's code number in a box. The code was shorter, less personal, avoided spelling problems, and discouraged looking over shoulders to see who told somebody (is is always possible to misread a number, but not a name). Use of the code also made the questionnaire information immediately ready for transfer to punch cards (1953, p. 305).

The second set of research materials employed in ECCO Analysis is, of course, the ECCO questionnaire. While the specific instrument used in a given study may vary, the instrument usually consists of five basic sections.

The first section of the questionnaire is designed to determine if the subject received a given message (or any part of it), and if so, to determine the accuracy of the information received. The following is an example of the first section of a typical ECCO questionnaire:

Survey No._____ Your Code No._____

COMMUNICATION SURVEY
(Confidential)

By no later than noon toady did you know the information in the box below, or ANY PART OF IT?

(1) John Doe (2) is leaving Tex Tan (3) soon (4) to enter the insurance business (5) in Yoskum

Please Check One:
___Yes I knew all of it.
___Yes I knew part of it. If so please list the numbers of the parts you knew ___, ___, ___, ___.
___No I did not know any of it.

If your answer above was "Yes I knew all of it" or "Yes I knew part of it" please complete the questionnaire by providing the information requested below.

If your answer above was "No I did not know any of it" you have completed the questionnaire. Please return the questionnaire to me or drop it in the Information Box. Thank you very much for your cooperation.

If you had the Information in the box but the facts you heard were different, please write the facts you heard next to the associated number.

1.
2.
3.
4.
5.

As the reader can see, this section of the questionnaire is specifically designed to: (1) present the message (unit of information) to be investigated (usually including who, what, where, when, and why types of data), (2) determine the level of the subject's information regarding the message (did he know all, part, or none of the information), and (3) determine whether one subject had heard the message accurately (what information dropped out or was added, if any).

The second section of the questionnaire simply asks the subject to identify the source from which he first received the message under investigation. An example of such a question might look like the following:

From whom did you first receive the information in the box? Please place the source's code number (from your code sheet) on this line _____.

Obviously, this very simple question is capable of yielding much data concerning: (1) liaison groups, (2) isolated groups, (3) direction of communication flow, (4) communication preferances within the organization, (5) consistency of communication flow, (6) types of information initiated by specific groups, and (7) a check on the physical activity of the respondent during the work day.

The third section of the questionnaire is designed to secure information concerning the physical location of the subject when he first received the information in the box. Specific areas to be observed here include the determination of whether the same individuals or groups receive and initiate communications regardless of where they are during the work period. An example of this section might appear as follows:

> Where were you when you first received the information in the box above? Please check one:
> ___At my desk board or other location where I carry out my job duties.
> ___Elsewhere in the room where I work.
> ___Outside this room but still working.
> ___Away from my unit-department but still working.
> ___Away from my unit-department but still not while working (coffee break, etc.).
> ___Away from the building and while not working.

Section four deals specifically with the realtive speed of the information as it moves within the organization. In addition to the determination of average speed, this section is able to furnsih data concerning the speed of different types of information. This section allows the respondent to indicate whether he had received the information as recently as that day or as long as six weeks or more. The following is an example of the type of item typically employed:

> How long ago did you first receive the information in the box? Please circle the approximate time:

Today Yesterday 3 4 5 6 7 days ago
2 3 4 5 6 weeks ago

The last section of the questionnaire is designed to secure information about the method or media by which the subject first receives the information. From these data the researcher is able to determine differences in the media involved between the different personnel units, shifts, departments, building, etc. Obviously, this section should be tailored to the specific company under investigation; however, the following serves as an example of such a setion:

> By what method did your first receive the information in the box above? Please check only one of the following methods:
>
> Written or Visual Methods
>
> __Personal letter from the Co.
> __Letter, memo or Service Program
> __Annual Report
> __News 1
> __Magazine
> __Tempo-70
> __Company Film
> __Public newspaper or magazine
> __Company Records
>
> Talking or Sound Methods
>
> __Talking with one other person in his presence
> __Talking over the telephone
> __Talking (and listening) in a small group of two or more
> __Attending an organized meeting or conference
> __Overhearing what someone else said
> __Radio or Television
>
> Miscellaneous:
>
> __I did it or I originated the information or decision
> __Other. Please explain.
>
> Thank you very much for your cooperation. Please return the questionnaire to me or drop it in the information box.

Data Collection. Experience with such questionnaire indicates that the instrument can be completed in about three minutes at the work place with negligible interference with production. In view of the speed with which the questionnaire can be administered, researchers typically run a number of surveys on various messages over a period of several weeks.

Since ECCO data is collected from many subjects, the establishment of a high degree of rapport between the subjects and the researcher is considered essential for the successful completion of such a study. Davis (1952), Marting (1969), and Rudolph (1971), have suggested the following guidelines in order that the desired rapport might be achieved and maintained: (1) visit with the subjects when distributing and collecting the questionnaires; (2) use as little of the respondent's time as possible; (3) instruct the subjects on how to respond to the questionnaire prior to the first administration; (4) learn as many of the names of the subjects as possible and use them whenever given the opportunity; (5) make a point of the anonymity (if it seems necessary) of each participant; (6) impress the subjects with the importance of their individual answers to the success of the study; (7) encourage questions about the project and attempt to answer them; (8) allow an appropriate amount of time for questionnaire completion; (9) develop employee interest and participation by requesting information for messages or communication episodes to be studied; (10) make sure the participants realize that an "I don't know any of the information" answer is just as important as an "I know it all" answer; and (11) keep abreast of any developing problems with the instrument and be ready and willing to make any necessary changes.

Data Analysis. Recalling the fact that ECCO Analysis is a descriptive research methodology, it is apparent that data derived from such investigations should be analyzed by means of appropriate descriptive statistics. This point is particularly important when one considers the fact that the type of data produced by the ECCO questionnaire are of the nominal (or classificatory) scale variety, which are appropriately analyzed by nonparametric tests (Miller, 1970).

Obviously, the first step in analyzing ECCO Analysis data is to tabulate individual responses and arrange these tabulations into predetermined groupings (e.g., work units, organizational levels, etc). Since Ecco Analysis was designed to permit comparisons between various groupings (departments, branches, or whole companies), Davis has devised a series of formulas which portray data on a uniform basis for comparisons. These forulas are described by Davis in the following:

> The first formula expresses the "receipt factor," which is simply the proportion of communications received by any unit. If seven out of 10 persons in a department were informed regarding a particular unit of information, the group receipt factor would be .7. If one person knew seven out of 10 units of information, his individual receipt factor would be .7. The formula is $\frac{R}{(PR)} = S$, where "R" is the number of receipt units, "(PR)" is the number of potential receipt units, and "S" is the receipt factor.
>
> Another relationship is the "propensity to be communicated," which shows the extent to which a unit of information is communicated beyond its origin. This forula is the receipt factor adjusted for those units involved in the information's origin, which gives a more refined picture of information spread beyond its origin. For example, if four persons in a department of 10 persons saw an event happen in a meeting and seven persons now know the information, it has spread to only three of the six potential recipients. The "Propensity to be communicated" in that case is .5, as expressed by the formula $\frac{R - O}{(PR) - O} = Y$, where "O" is the number of persons involved in the communication origin, and "Y" is the propensity to be communicated.
>
> A third relationship is the "initiation factor," which is the proportion of iniation units compared to potential units. In a department of 10 persons, if seven act as initiators, the group initiation factor is .7. If one person has 10 opportunities to communicate and uses only seven of them, his initiation factor is .7. The formula is $\frac{I}{(PI)} = J$, where "I" is the number of initiation units, "(PI)" is the potential number of initiation units and "J" is the initiation factor.
>
> A high initiation factor means that many people are spreading the information, but it does not indicate how many persons each initiator informs. If actual receipt units are divided by actual initiation units, the quotient is the average number of receipt units accomplished by each initiation unit. The formula is R/I - M, the "multiplier factor." If there are nine iniators within a group of 36 recipients, the multiplier factor is 4.0.

> In 14 surveys of the management group at Tex Tan Company the group receipt factor was .42., with a range of .08 to .81. In three surveys the group initiation factor ranged from .11 to .20 (average .15) and the multiplier factor ranged from 3.3 to 6.9 (average, 4.4). These relationships were computed for various departments, organizational levels, functional groups, and geographical groups (1953, pp. 308-310).

Before concluding this section, it might be noted that other methods of analyzing ECCO Analysis data may be found by consulting the "references" section at the end of this paper.

What are the Strengths of ECCO Analysis

The ECCO Analysis research methodology seems particularly suitable for use in organizational enviornments because:

1. ECCO Analysis has been used in prior organizational research with consistent success (see for example Davis, 1952; Smith, 1971; and Tope, 1971).

2. ECCO Analysis provides an effective method for collecting data in a field situation and thereby overcomes many limitations inherent in laboratory research (see for example Rudolph, 1941; and Marting, 1969).

3. ECCO Analysis has been found to provide insights into overall patterns of communication within departments of organizations (see for example Sutton and Porter, 1968; Sutton, 1969; and Davis, 1968).

4. ECCO Analysis is not a "one shot" questionnaire. Over a period of time a communication pattern can be constructed based upon the data gathered (see for example Marting, 1969; and Lee, 1971).

5. ECCO Analsyis appears to meet many of the desireable qualities of a data gathering instrument as mentioned by Davis (1952).

6. ECCO Analysis provides for the anonymity which is often considered desirable when attempting to obtain research data from individuals (see for example Sellitz, Jahoda, Deutsch and Cook, 1961; and Mouly, 1953).

7. ECCO Analysis allows the investigator to destribute and collect each questionnaire personally. In this manner rapport, and consideration with the organization is increased (see for example Marting, 1969; and Rudolph, 1971).

8. ECCO Analysis requires only a brief response time. Researchers have known for some time that an inherent weakness of the interview technique has been the amount of time required (Davis, 1962, p.52). As the interview progresses, the employee sometimes becomes disinterested. The result is often encomplete or incorrect answers. The interview typically also takes the individual away from his place of work. ECCO Analysis does not take the individual away from his job (see for example Orlet, 1971).

9. ECCO Analysis has proven to be rulatively low in cost (see for example Marting, 1969; and Rudolph, 1971). In a situation where there is little or no economic support from the organization and the investigator is working with limited funds, a method involving low expenditures is partiucarly desirable.

10. ECCO Analysis exhibits qualities of simplicity and clarity. The point has been made that industry has begun to recognize that semantics are an important part of communication. In research such as this, a situation could arise in which the investigator would be given little or no time or opportunity to instruct the participants on completing the survey (Freeman, 1971). If a situation such as this were to become reality, the questionnaire should be simple,

clear, and if possible, self explanatory. Being as simple and concise as it is, the ECCO Analysis format implements clarity. Research indicates that as each participant completes several closely related questionnaires, the repetition involved assists the respondents in becoming at ease with the instrument (see for example Marting, 1969; and Rudolph, 1971).

11. ECCO Analysis provides for the inclusion of a more than responsive sample (see for example Dillingham, et al., 1971; and Neely, 1971). In many instances the entire population can be included in the survey with little additional time. With limited resources and a small research team, the interviewing of a representative sample of an organization of 500 would no doubt prove to be somewhat difficult. With ECCO Analysis the entire population can be included.

12. ECCO Analysis is adaptable to varying situations. An exceptionally useful feature of the ECCO Analysis method is that the basic questionnaire can be used in several situations without being redesigned. The same questionnaire can be administered numerous times with only a slight modification required. What small modification there is concerns only the specific message or information episode investigated and not the basic questionnaire (see for example Latsky, 1971; and Stoneburner, 1971).

13. ECCO Analysis allows the collection of data with only a slight disturbance to the participants (see for example, Britt, 1971). Davis (1952, p. 57) has stated that ". . . one of the fundamental problems of all social research is the probability that the very process of research itself may affect the situation." Davis further commented:

In the particular case of personal communication surveys,

> therefore it is desirable that the survey be made without adversely affecting employees' attitudes or work habits, and that it have minimum effect upon the data being collected.

Research indicates that the conciseness of the instrument and the speed with which it can be administered and collected would approach the conditions mentioned above (see for example Baur, 1971; Marting, 1969; and Rudolph, 1971).

14. In research of this nature, the interview has been found to be rather inconsistent from one situation to another as discussed by Sellitz, et al., (1961, p. 329). Even though the questionnaire is standardized and should provide for uniformity, the words are often misunderstood. ECCO Analysis provide the advantages of both methods. As the investigator is available to the participants to answer questions, an increased degree of uniformity from one measurement situation to another is achieved as demonstrated by Rudolph (1971).

15. The format followed allows the individual to complete the questionnaire at his own pace. Utilization of this method removes the participant from the pressure of the interview situation. It also assures, however, that the participant does complete the questionnaire. In a timed interview situation the subject often replies with the first thought which come to mind (see for example Sellitz, et al., 1961, p. 241; and Mouly, 1963, p. 241). If the participant so desires ECCO Analysis allows time for reflection. Once a response has been determined, large blocks of space are not necessary for its recording.

What are the Weaknesses of ECCO Analysis?

No research methodology is perfect and ECCO Analysis is no exception. There exist several weaknesses in the questionnaire

method of data collection as a whole. ECCO Analysis accounts for many of these but as will be discussed below, several remain at this point unresolved.

1. A well known weakness of the questionnaire method is the lack of responses (see for example Auer, 1959, p. 148; Bormann, 1965, p. 348; and Sellitz, et al., 1961, p. 261). Mouly (1963, p. 240) holds that lack of responses is the questionnaire's major weakness. Prior usage of this particular instrument, however, has determined thae rate of response to be near or at 100 per cent (see for example Davis, 1952; Marting, 1969; and Rudolph, 1971).

2. The charge has been made that the questionnaire often fails to obtain answers to all questions or obtain answers as complete as those resulting from an interview (see Sellitz, et al.. 1961, p. 242; Bormann, 1965, p. 348; and Mouly, 1963, p. 241). Previous studies utilizing tge ECCO Analysis technique have found that the questions are so brief and so simple that the entire questionnaire is invariable completed (see for example Baur, 1971; Freeman, 1971; and Trope, 1971).

3. A questionnaire is often destined to succeed or fail on the strength of administation. Within the context of the ECCO Analsyis methodology the instrument is administered several times in succession thus providing an opportunity for correction as the study progresses. It is generally anticipated that major problems will be screened by preadministration introduction and pre-test applications.

4. Some authors feel that a basic fault of the questionnaire method is the possible mininterpretation of the questions by the subject. Although there is no specific answer for this criticism offered by ECCO Analysis, it is assumed that the simplicity of

the questions, the preadministration, the pre-test situation, the fact that the same questionnaire is used repeatedly and the investigator is available to answer questions overcomes any misunderstanding on the part of the participants. Research by Rudolph (1971) bears out these assumptions. Questionnaires are often filled in hurriedly. It is assumed that the simplicity of the questionnaire and the brief time required compensates for this fault in using questionnaires. Studies by Davis (1968) and Sutton and Porter (1968) have indicated these assumptions to be true.

5. A weakness not unique to ECCO Analysis by particularly applicalbe is that of participant honesty in completing the questionnaire. An examination of studies utilizing ECCO Analysis by Davis (1952) and Marting (1969) reveals comments to the effect that an individual is likely to be honest because he knows that his responses have to fit into an overall communication pattern. In an attempt to resolve this question of honesty, Rudolph tested 30 management level personnel of a United States governmental agency. Results indicated that in the instances evaluated, the subjects responded honestly to the ECCO Analysis instrument (Rudolph, 1971).

Summary

The purpose of the present paper was to provide common methodological frame of reference from which to view the research papers presented in the Division IV program entitled "ECCO Analysis as a Research Strategy." As such, the paper sought to answer four basic questions: (1) What is ECCO Analysis?, (2) How does ECCO Analysis work?, (3) What are the strengths of ECCO Analysis?, and (4) What are the weaknesses of ECCO Analysis?

This discussion was not intended to be a comprehensive examination of the pros and cons of using a questionnaire or interview research methodology. Numerous authors have dealt extensively with such survey methodologies (see for example, Parten, 1950; Miller, 1970; Mouly, 1963; Sellitz, et al., 1961; and especially Mouly, pp. 275-278 and Miller, pp. 112-114 for data collection bibliographies). However, it is hoped that this brief description of ECCO Analysis has achieved its purpose of establishing a methodological frame of reference for the papers which follow in the program.

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